



**Task Force Meeting  
May 17, 2006**



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# LOER Components and District Lead Responsibilities

- **Lake Okeechobee Fast Track Projects**
  - Revise Lake Okeechobee Operating Schedule (will require significant District support)
  - Set TMDLs for tributaries
  - Mandatory fertilizer BMPs
- **ERP Revisions**
  - **Alternative storage/disposal of excess surface water**
  - Innovative land use planning
  - Eliminate land application of wastewater treatment residuals
- **Lake Okeechobee Protection Program**
- **CERP Lake Okeechobee Watershed Project**

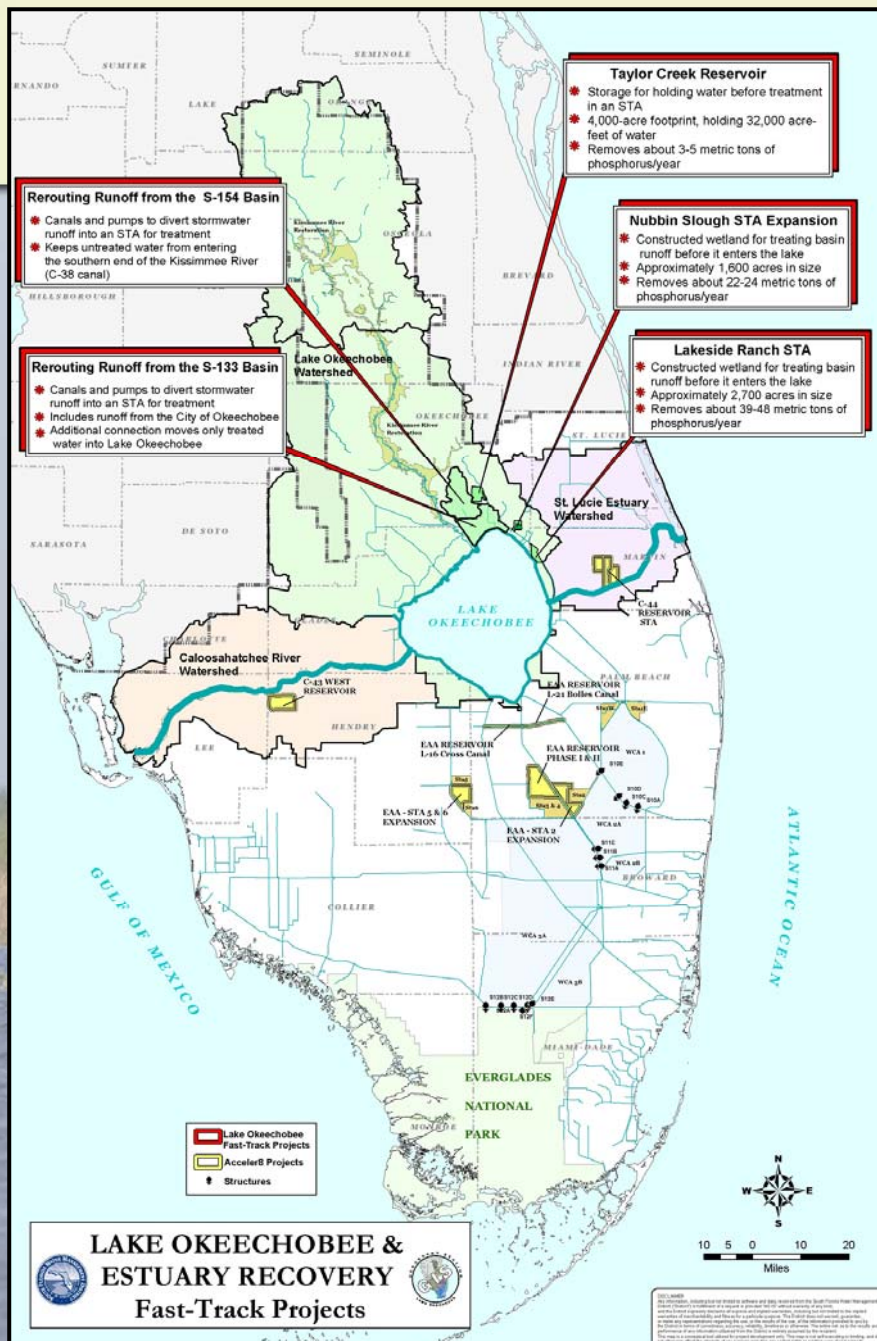


# Lake Okeechobee and Estuary Recovery

- All LOER components are progressing
- At the request of the Governing Board in January, additional efforts have been incorporated including:
  - In-lake nutrient removal options
    - Marsh flow-ways
    - Sediment removal
  - Implement ASR
  - Feasibility of deep well injection







# Lake Okeechobee Fast-Track Projects

5 construction projects north of Lake Okeechobee:

- Nubbin Slough STA Expansion
- Taylor Creek Reservoir
- Lakeside Ranch STA
- Rerouting Runoff from the S-133 Basin
- Rerouting Runoff from the S-154 Basin



# Lake Okeechobee Fast Track Projects

## Completed by May 31, 2006

- Complete design for Nubbin Slough expansion - **COMPLETE**
- Issuance of work order to prepare BODR over the Lakeside Ranch STA, Taylor Creek Reservoir and Re-routing of water for S-154 & S-133 Basins – **WORK ORDER TO BE ISSUED IN MAY**
- Development of Fast Track Project Plan and Schedule - **COMPLETE**

## Initiated by May 31, 2006

- Permitting for Nubbin Slough STA expansion - **UNDERWAY**
- BODR for re-routing of water from the S-154 basin - **WILL COMMENCE IN MAY**
- Geotechnical Investigation Program for Taylor Creek Reservoir and Lakeside Ranch STA - **WILL COMMENCE IN MAY**
- Surveying of Taylor Creek Reservoir and Lakeside Ranch STA - **WILL COMMENCE IN MAY**
- BODR for permanent forward pumps - **UNDERWAY**





# Revise Lake Okeechobee Regulation Schedule

**Work with U.S. Army Corps of Engineers to revise federal regulation schedule levels**

- Achieve a better balance among lake management objectives





# Revise Lake Okeechobee Regulation Schedule – USACE lead

## Completed by May 31, 2006

- Temporary Forward Pumps bid process – **BIDS DUE MAY 9th**
- GB authorization for development of revisions to water shortage plan – **RECEIVED, WORKSHOPS UNDERWAY**
- Alternative regulation schedules developed and under review – **COMPLETE, IDENTIFICATION OF TENTATIVELY SELECTED PLAN DUE MAY 10th**

## Initiated by May 31, 2006

- Revise Supply Side Management and water shortage rules - **UNDERWAY**
- Purchase temporary forward pumps and prepare installation sites – **BID PROCESS UNDERWAY, SITE PREPARATION TO BE COMPLETED BY JANUARY 2007**





# Revise ERP Criteria

**Supplement the Environmental Resource Permit (ERP) criteria to better address the water quality impacts due to new development and land-use changes within the Kissimmee, Lake Okeechobee, Caloosahatchee Estuary and St. Lucie Estuary watersheds**







## Revise ERP Criteria

### Completed by May 31, 2006

- GB authorization for development of revisions to ERP rule - **COMPLETE**
- **Conducting initial stakeholder meetings**

### Initiated by May 31, 2006

- Development of basin rule methodology for reducing nutrient loads from new development



# Alternative Storage/Disposal of Excess Surface Water

- Identify alternative sites on public, private, and tribal lands for moving and storing excess water from the lake and its tributary basins to help reduce high discharge volumes to the estuaries

- Assess feasibility of deep well disposal and ASR options for Taylor Creek and the Brighton Reservation







# Alternative Storage/Disposal of surface water

## Initiated by May 31, 2006

- Seminole Brighton 800 ac. reservoir/STA final design – **TO BE INITATED**
- Construction of 4 pilot water storage facilities on private lands – **LANDOWNER AGREEMENTS COMPLETED FOR THREE PROJECTS; ONE IN PROGRESS**
- Assessment of private and tribal lands for potential water storage – **PURCHASE ORDER IN NEGOTIATION**
- Conceptual designs and cost estimate for additional public land water storage sites - **ONGOING**
- Feasibility study of deep well injection - **WORK ORDER NEGOTIATION COMPLETED AND WORK WILL BEGIN BY JUNE 2006**
- Feasibility study of re-activation of Taylor Creek ASR well – **WORK ORDER NEGOTIATION COMPLETED AND WORK WILL BEGIN BY JUNE 2006**
- Siting evaluation for construction of a 10 ASR well system - **WORK ORDER NEGOTIATION COMPLETED AND WORK WILL BEGIN BY JUNE 2006**
- Siting and conceptual design of the Brighton Reservation ASR well - **WORK ORDER NEGOTIATION COMPLETED AND WORK WILL BEGIN BY JUNE 2006**



# Alternative Storage/Disposal of surface water

## Completed by May 31, 2006

- Complete assessment of public land storage - **COMPLETE**
- Lykes Basinger Groves water storage pilot – [pump installed and operational 1/27/06](#)
- Complete conceptual designs and cost estimates for public land water storage (multiple sites including Avon Park Bombing Range, Kissimmee Prairie Preserve State Park) - **UNDERWAY**
- Complete evaluation of cost-effectiveness of water storage options - **UNDERWAY**
- Seminole Brighton 800 ac. reservoir/STA conceptual design - **COMPLETE**







# Continued Implementation of the LOPP & CERP LOWP

Comprehensive,  
phased approach  
already under way to  
reduce phosphorus  
loadings and provide  
water storage to the  
lake by 2015





# Continued Implementation of the LOPP & CERP LOWP

## Completed by May 31, 2006

- Nubbin Slough Pilot STA (6.5 mt P reduced; 1600 ac. ft. storage) – **RIBBON CUTTING CEREMONY APRIL 27th**
- Taylor Creek Pilot STA (2.8 mt P reduced; 480 ac. ft. storage) - **RIBBON CUTTING CEREMONY APRIL 27th**
- Over 35 projects in the northern watershed for a combined load reduction of approximately 90 tons and storage of approximately 40,000 ac. ft.

## Initiated by May 31, 2006

- Acquisition of lands for Lemkin Creek urban STA - **UNDERWAY**
- Re-mapping of lake sediments - **WORK ORDER EXECUTED, WORK UNDERWAY**

## Ongoing projects

- BMP implementation on agricultural and urban areas (with FDACS and FDEP)
- CERP Lake Okeechobee Watershed Project PIR







# Set TMDLs for Lake Okeechobee Tributaries - FDEP

Speed up development of total maximum daily loads of phosphorus allowed for the Lake Okeechobee watershed tributaries to protect and restore downstream water bodies





# Set TMDLs for Lake Okeechobee Tributaries - FDEP

■ FDEP has a contract underway to evaluate existing models and data, plus additional monitoring, to set approximately 70 TMDLS December 2007. This is four years ahead of schedule.

■ The development of TMDLs for the St. Lucie and Caloosahatchee Estuaries and their tributaries is proceeding on schedule







# Mandatory Fertilizer BMPs - FDACS

Revised application rates for agriculture; low phosphorus for urban use

Reassess fertilizer application rates for agriculture and encourage the development and use of low phosphorus fertilizer in urban settings







## Mandatory Fertilizer BMPs - FDACS

- Adoption of revised Lake Okeechobee BMP rule, expanded to entire LOER watershed, by May 31st
- Ongoing meetings with the Florida Fertilizer and Agrichemical Association and U. Florida - IFAS to assess fertilizer recommendations for turf grasses and agricultural crops







# Innovative Land-Use Planning - FDCA

**Innovative land-use planning techniques, including use of Florida's Rural Land Stewardship Areas Program, to facilitate the acquisition of lands for public works**





# Eliminate Land Applications of Residuals - FDEP

End the practice of depositing domestic wastewater residuals on land, which can result in excess nutrients getting in tributaries and estuaries

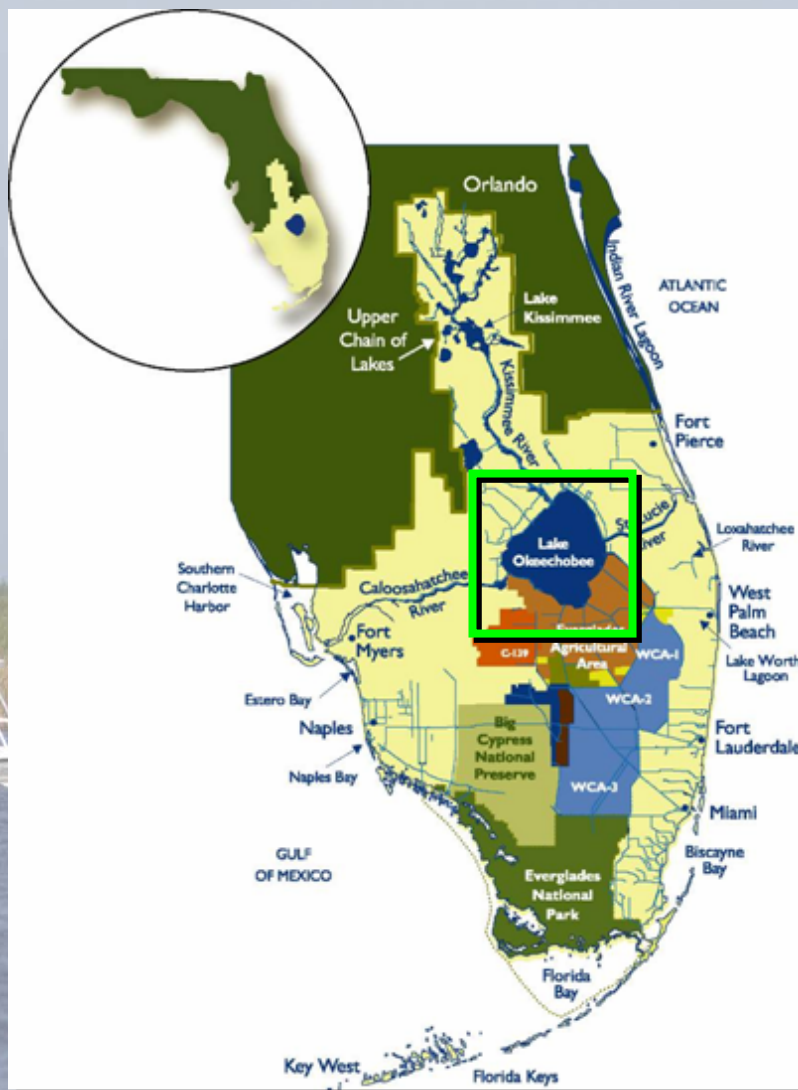
- Assessment of where and how wastewater residuals are currently applied is underway







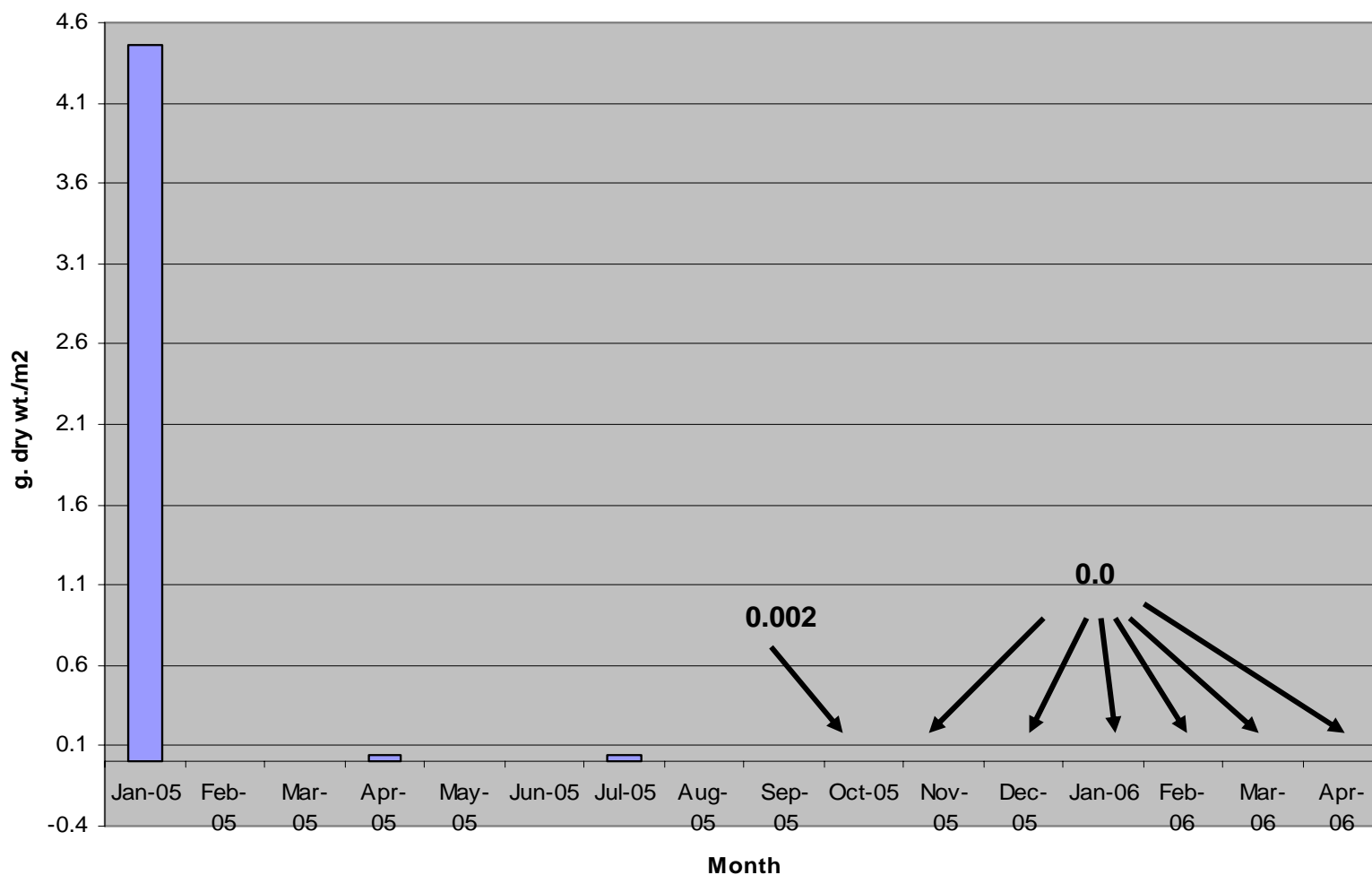
# Okeechobee





# Submerged Aquatic Vegetation

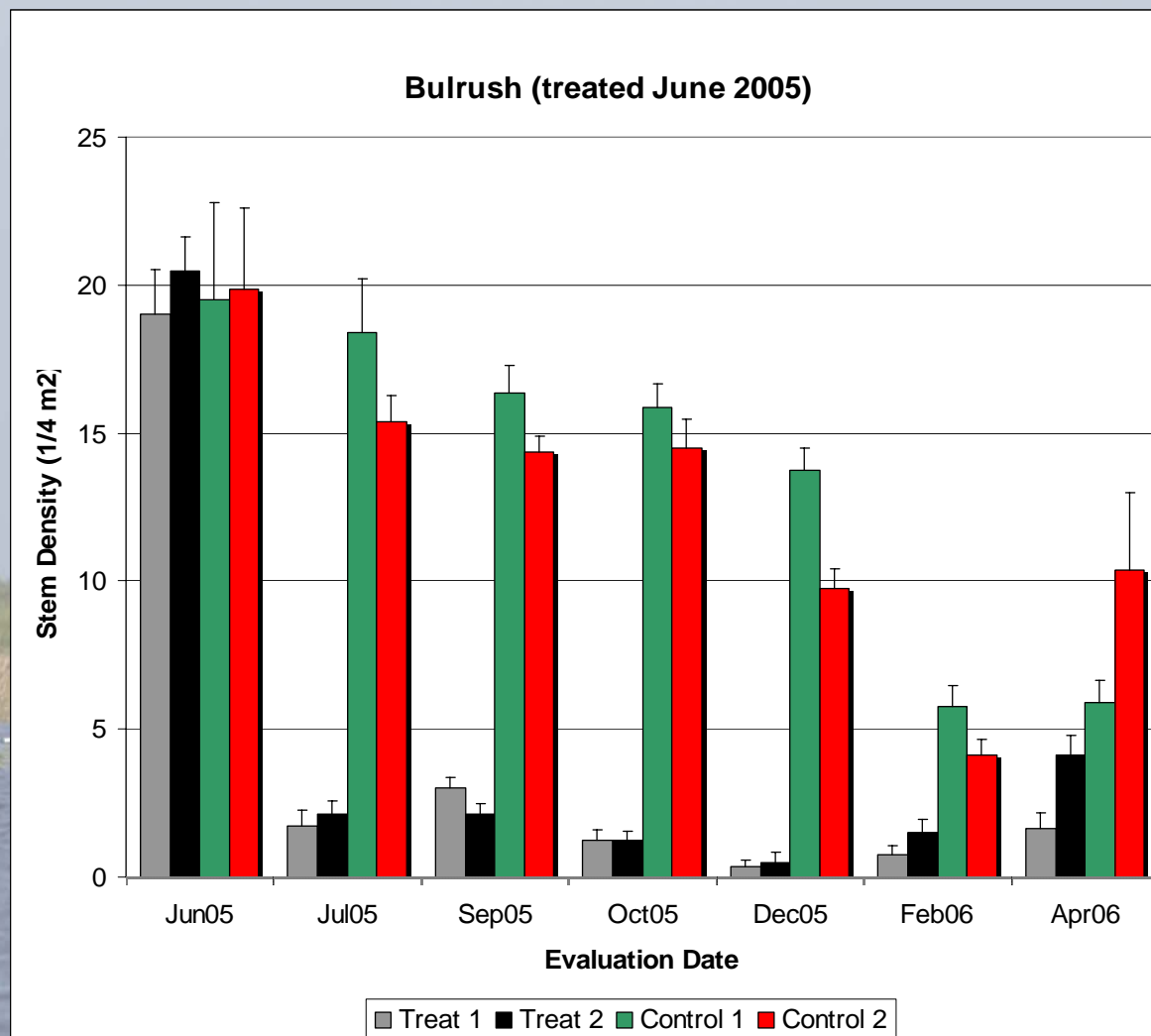
Mean SAV Density at Transect Sites







# Bulrush re-growth in Lake Okeechobee





## Evaluation of new water quality treatment technologies

- On-going inquiries from outside vendors on the applicability of their technologies for water quality improvement
- District staff request data and/or documentation of performance and cost effectiveness through a Standard of Comparison process

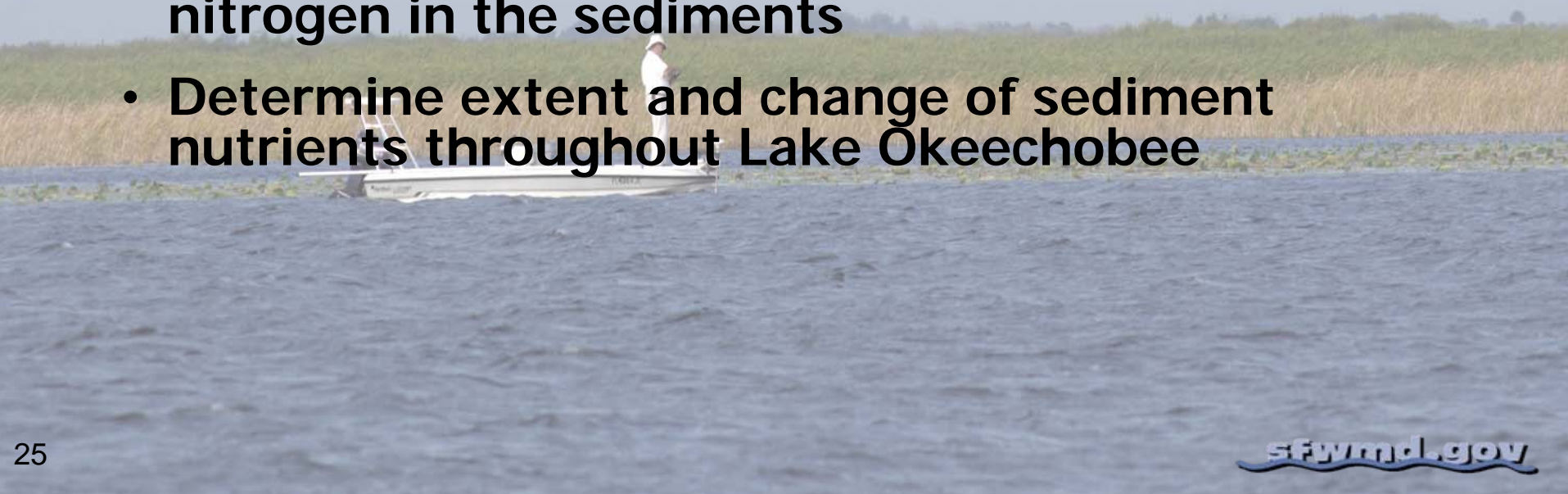




## Lake Okeechobee Sediment Quality Mapping

### What are impacts of 2004 and 2005 hurricanes and continued excess P loading?

- Determine the extent and change in mud sediments throughout Lake Okeechobee
- Determine pools and forms of phosphorus and nitrogen in the sediments
- Determine extent and change of sediment nutrients throughout Lake Okeechobee

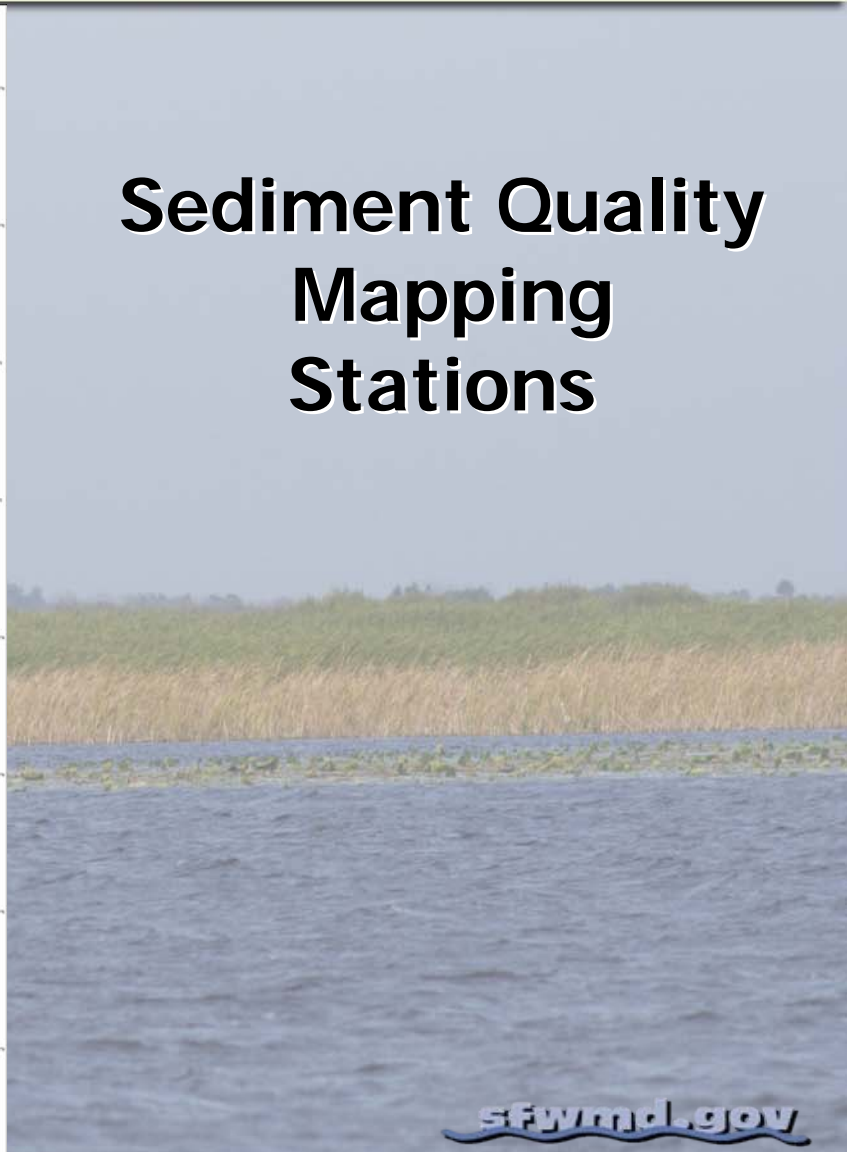
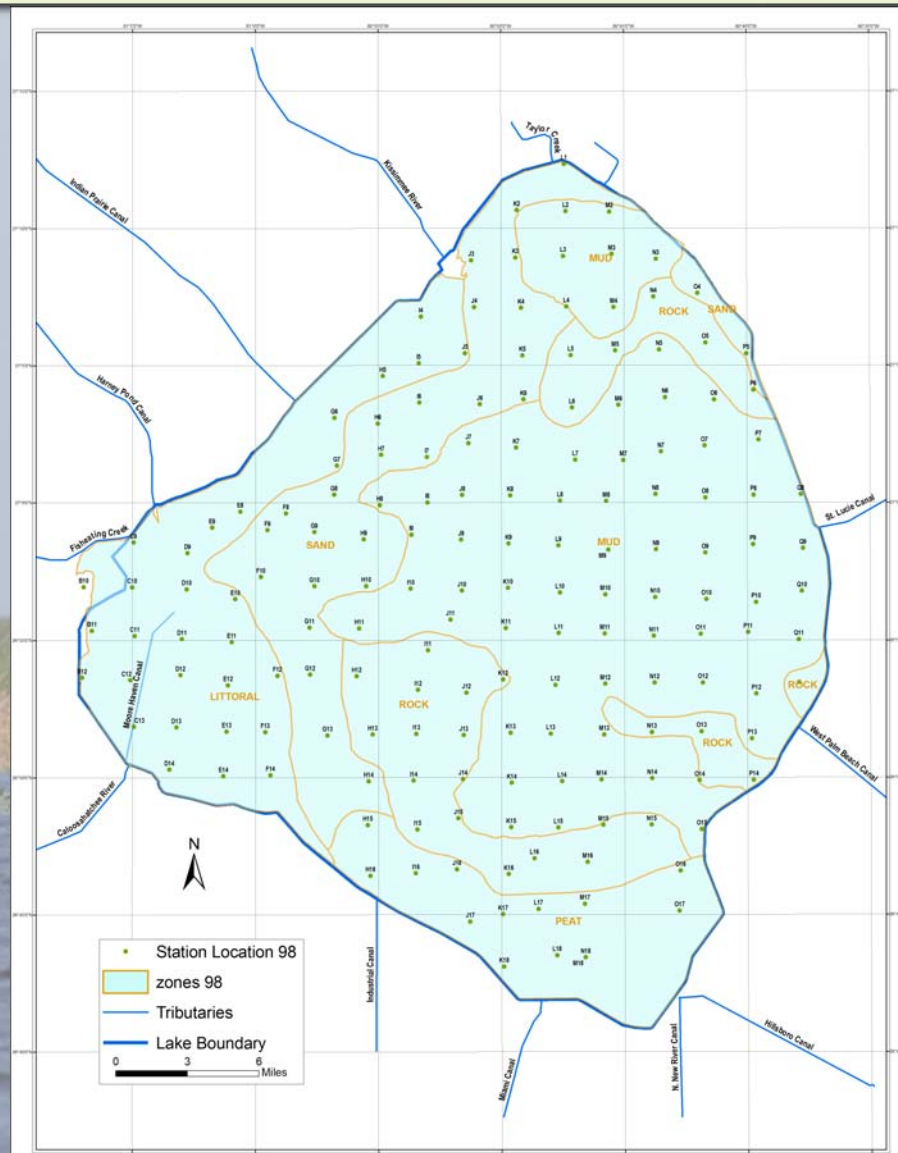








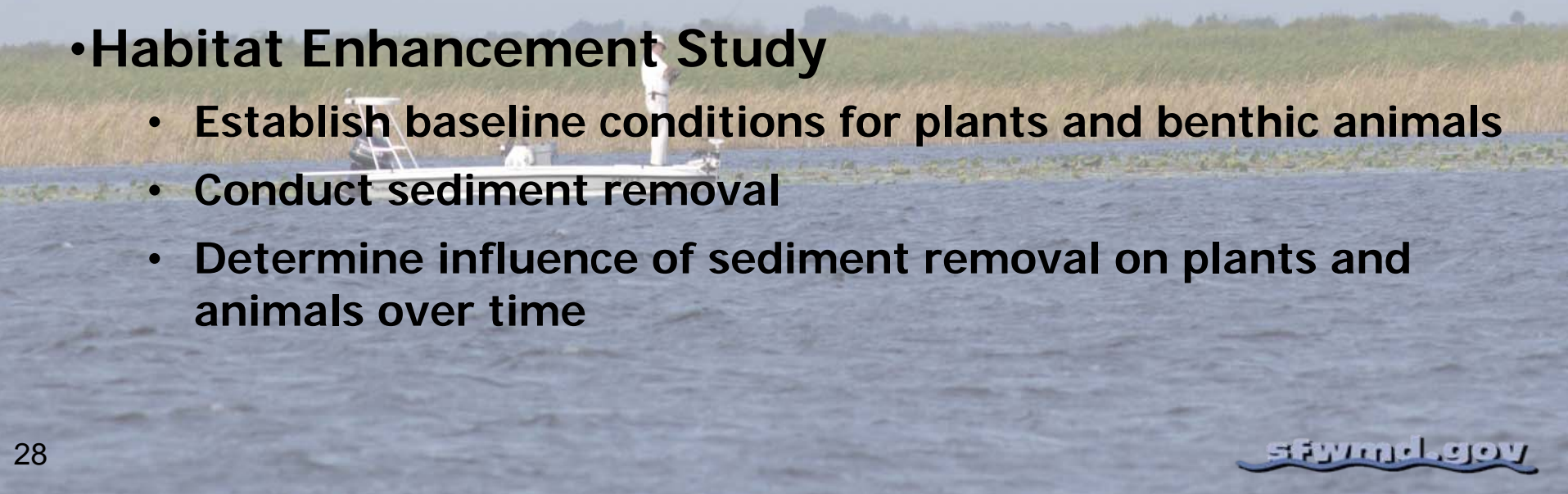
# Sediment Quality Mapping Stations





## Mud Sediment Spot Dredging for Habitat Enhancement

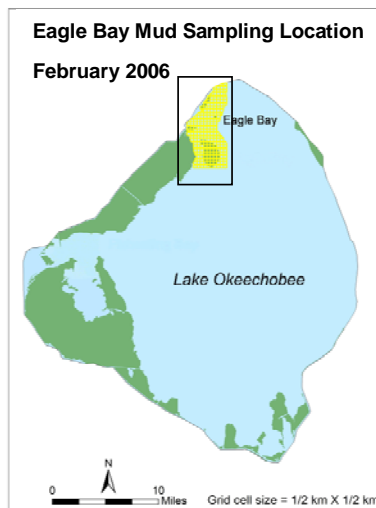
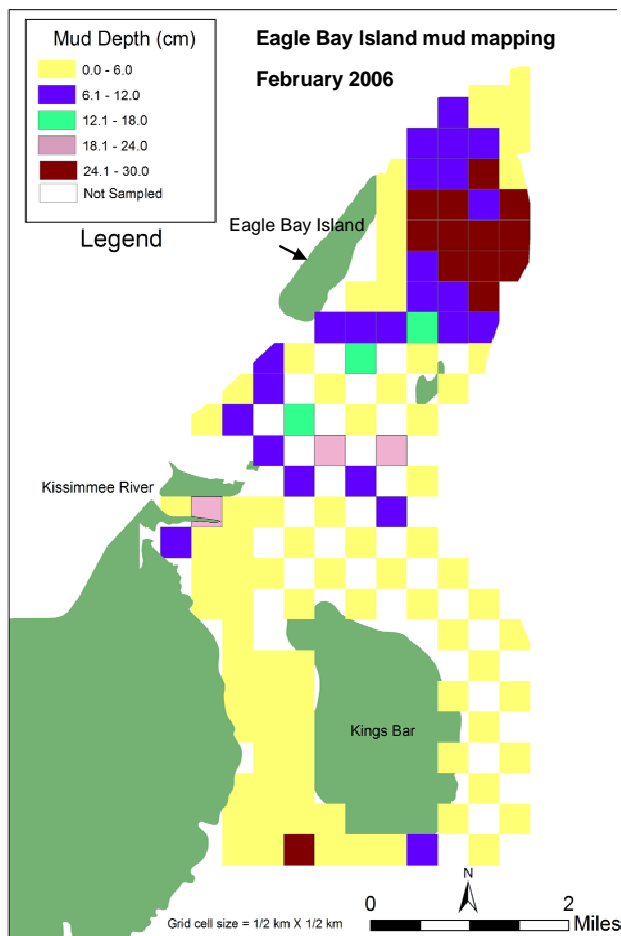
- **Locate areas of mud sediment in littoral or nearshore region**
  - Identify suitable shallow, muddy, isolated areas (currently underway)
  - Map mud sediments
- **Identify new technologies – 7 inquiries to date**
- **Habitat Enhancement Study**
  - Establish baseline conditions for plants and benthic animals
  - Conduct sediment removal
  - Determine influence of sediment removal on plants and animals over time







# Eagle Bay "Hot Spot" Remediation





# St. Lucie and Caloosahatchee Estuaries







## Lake Operations

**High regulatory releases from Lake Okeechobee to the St. Lucie and the Caloosahatchee were terminated on January 12.**

**A series of 4 level 1 pulses have been made to both estuaries beginning on 2/16, 3/1, 3/13, 3/31**





## St. Lucie Estuary

- Salinity conditions in the estuary are good. Salinities at the US1 and A1A Bridges are within the preferred envelopes.
- Water clarity has improved significantly and is not limiting seagrass growth near the St. Lucie Inlet.
- Seagrasses in the vicinity of the St. Lucie Inlet remain sparse. Some new growth has been observed.
- No live oysters have been found upstream of the A1A Bridge.







# Caloosahatchee Estuary

- Salinity conditions are good throughout the estuary and San Carlos Bay and the 30-day average discharge at S-79 is within the preferred range.
- Water clarity has improved and is not limiting to seagrass growth in the lower estuary or San Carlos Bay. Turbidity remains high in the upper estuary.
- The density of tape grass in the upper estuary and seagrasses in the lower estuary and San Carlos Bay remain sparse. Seagrasses have begun to produce new blades.
- No live oysters have been found upstream of Shell Point. Those located further downstream have survived. These populations typically begin to reproduce in May.



## Conclusion

- Environmental conditions in both estuaries have improved since high freshwater discharges stopped.
- The growing season for seagrasses has begun.
- Recovery of plant and animal communities will continue as long as environmental conditions are favorable.





# Everglades





## Water Quantity Issues

### Question:

Why have Lake Okeechobee discharges been so high in recent years?

### Answer:

Climate indicators suggest a wet regime has returned to south Florida.

Rainfall during the 2004 & 2005 wet seasons produced very large inflows to Lake Okeechobee

- Rainfall 13.5" above normal in Upper Kissimmee 2004 & 2005
- Inflows 8<sup>th</sup> & 9<sup>th</sup> highest since 1914
- 7 higher years include 1928 & 1947

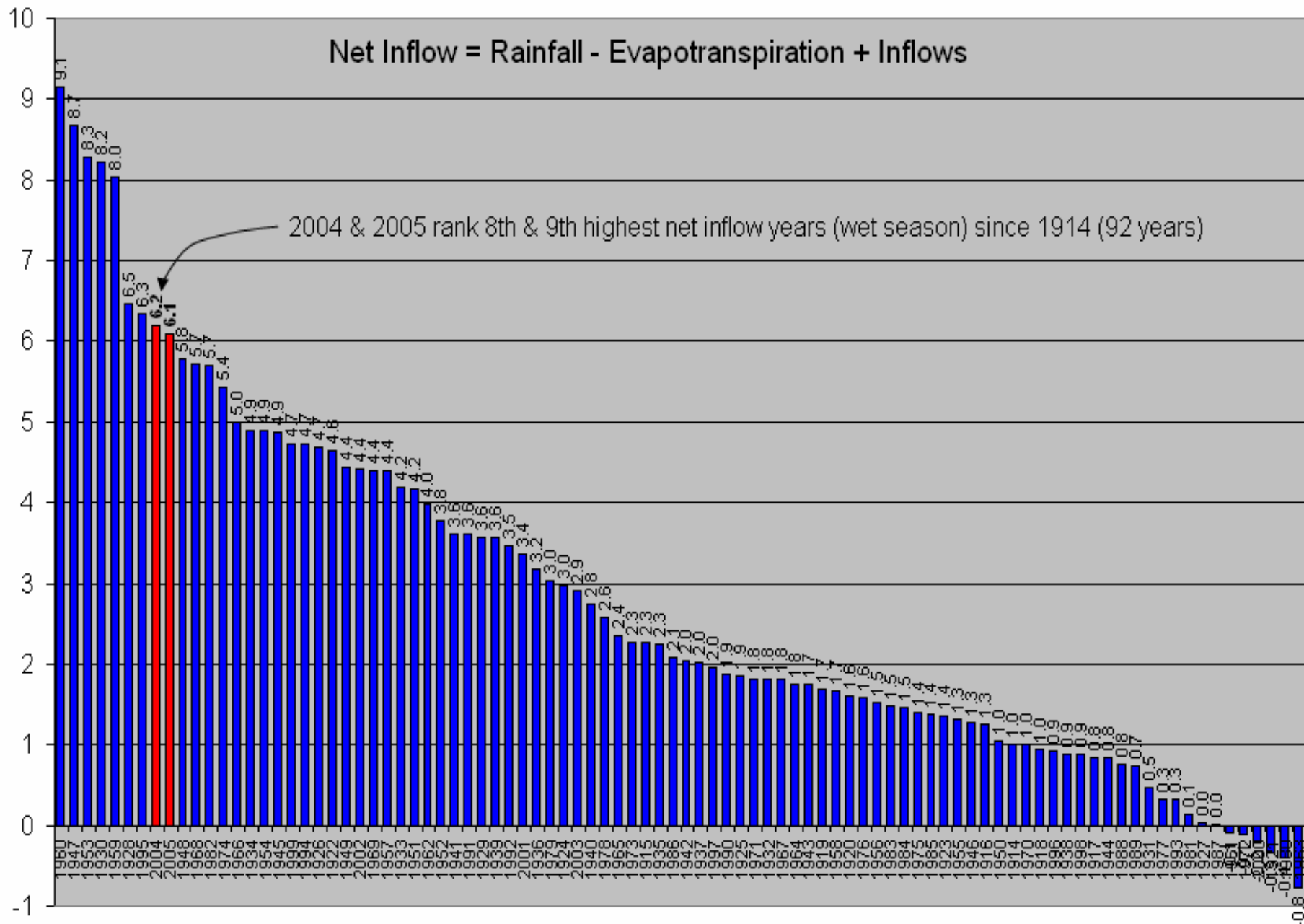
By design, large releases from Lake Okeechobee to the estuaries have been required for the last 100 years.



# Lake Okeechobee Wet Season Net Inflow

Net Inflow = Rainfall - Evapotranspiration + Inflows

Wet Season Volume (feet of equivalent LKO depth\*)



\* Volume converted to equivalent depth using area of 467,000 acres

Wet Season: June-October



# Water Quality Improvements

## Stormwater Treatment Areas:

- Six STAs on-line
- More than 40,000 acres constructed
- STA 3/4 -- largest constructed wetland in world, has treated over 500,000 acre-feet of stormwater

Combined with BMPs,  
more than 2,200 metric  
tons of phosphorus  
removed since 1996







# Water Quality Improvements

**This past year alone:**

**Enhanced 11,236 acres of STAs**

**STAs treated more than 1.5 million acre-feet of stormwater**





# Water Quality Improvements

**STAs achieved 71% phosphorus removal rate in WY2005\***

## 2005 Results:

- 261 tons of phosphorus prevented from entering Everglades (this year)
- Phosphorus reductions in EAA better than double amount required by law

## 10 year total:

- BMPs: 1600 tons of phosphorus from entering Everglades
- Annual reductions ranged from 34-73% (25% required by law)







# Opportunities for Local Government Participation

- Implement stormwater utilities and stormwater retrofits
- Assist with BMP implementation for low P fertilizer in urban settings
- Move forward to convert septic systems to central sewers
- Land acquisition for preservation & Restoration



## Other Agency Actions

- **Implement Modified Water Deliveries**
- **Removal of sediments and bank stabilization of the C-44**
- **Retrofit S-308 and S-77 for mid or top water releases**

